Tests for Corrosiveness

The tests listed below are done to determine the corrosivity of well water.
• Alkalinity
• Total Dissolved Solids
• Hardness
• Specific Conductance

These items should be tested for:

- Every 3 – 5 years
- If you are considering installing a home water treatment system
- If you are buying a home with a well
- If you are have had a new well installed

Have the well water tested at a certified lab.

Below is a brief explanation of each test.

Alkalinity

Alkalinity measures the water's buffering capacity. It measures the ability of water to neutralize acids and bases to maintain a fairly stable pH. The lower the alkalinity, the more likely the water is to be corrosive.

Alkalinity is measured as milligrams per liter of calcium carbonate.

Potential effects of alkalinity

Alkalinity is not a pollutant; it is a natural characteristic of the water.

The alkalinity of well water is affected by the soil and rock that the groundwater flows through. For example:

- Areas with limestone deposits tend to have water with higher alkalinity.

- Areas with granite bedrock, which make up large portions of Rhode Island, tend to have water with lower alkalinity.

Very low and very high values of alkalinity can cause nuisance problems. Alkalinity values less than 75 milligrams per liter can change pH levels in water and make the water corrosive. Corrosive water can then lead to potentially harmful metals dissolving from the plumbing into the drinking water.

High alkalinity values (over 500 milligrams per liter) are associated with high dissolved solids and water hardness which can cause scale buildup on plumbing systems, especially hot water systems. Scale build up in the plumbing system can increase power consumption and costs to heat water.

What is the standard for alkalinity in drinking water?

There is no health standard set by the Environmental Protection Agency for alkalinity. Below is a general guideline of alkalinity values:

- Alkalinity values of 0 – 100 milligrams per liter often results in corrosive water if the pH is also low (less than 7).
- Alkalinity values of 100 – 200 milligrams per liter are ideal.
- Alkalinity values greater than 200 milligrams per liter can lead to deposits or scaling in the plumbing.

Total Dissolved Solids

Total dissolved solids, (TDS), refer to the total amount of inorganic and organic substances, including minerals, salts, and metals in the water.

Potential effects of TDS

Drinking water with a high TDS content may indicate high levels of substances that pose a health concern, such as aluminum, arsenic, copper, lead and nitrate. As a result, if water test results show high levels of TDS, more testing may be necessary.

In addition, high TDS levels can lead to nuisance problems such as:

- Scale buildup in pipes, reduced efficiency of water treatment systems and hot water heaters
- Hard water
- Colored water and staining of plumbing fixtures and laundry
- Bitter or salty taste in the water

What is the standard for TDS in drinking water?

- The Secondary Maximum Contaminant Level set by the Environmental Protection Agency for TDS is 500 milligrams per liter or 500 parts per million.

How can TDS get into my well water?

Sources of TDS include:

- Agricultural and urban runoff
- Stormwater runoff
- Industrial wastewater
- Sewage
- Natural sources such as leaves, silt, plankton, and rocks
- Metals leached from plumbing
- Road salt

Hardness

Water described as "hard" is high in dissolved minerals, specifically calcium and magnesium. As groundwater moves through soil and rock small amounts of minerals become dissolved in the water. Calcium and magnesium are the two most common minerals that make water hard. As the calcium and magnesium content increase in the drinking water, the hardness level will also increase.

Effects of hard water

Hardness does not pose a health risk and is not regulated by state or federal agencies. Hardness is a natural characteristic of the water. In fact, calcium and magnesium in your drinking water can help ensure you get the average daily requirements of these minerals in your diet.

Hard water can be a nuisance. It often causes problems, such as:

- Build-up of scale on pipes and fixtures that can lead to lower water pressure and shorten the life of plumbing systems
- Lowered efficiency of electric water heaters
- Difficulty in getting soap and detergent to foam
- Build-up of deposits on dishes, utensils and laundry basins
- Bathing in hard water can leave a sticky film of soap on the body
- Can make brewed coffee and tea taste bitter

A water hardness scale

The U.S. Geological Survey's water hardness scale:
Concentration of hardness measured as calcium carbonate in milligrams per liter

0 – 60	milligrams per liter	Soft
61 – 120	milligrams per liter	Moderately Hard
121 – 180	milligrams per liter	Hard
181+ milligrams per liter		Very Hard

Treating well water for hardness

A water softener will remove calcium and magnesium from the water. Be aware that water softeners can increase the sodium content of drinking water. If someone in your household is on a low-sodium diet, discuss this type of water treatment with your doctor prior to installment. Potassium chloride may be used in place of sodium chloride, but the cost may be higher.

Specific Conductance

Specific conductance is a measure of the water's ability to conduct an electrical current. It is an indirect measure of the presence of dissolved minerals in the water, but it does not give an indication of which minerals are present. For example, pure water will have a very low specific conductance whereas rainwater or seawater will have a higher specific conductance.

Potential health effects of specific conductance

Test results for specific conductance can indicate water pollution. The health affects of water with a high specific conductance will vary depending on the type of dissolved solids present in the water. In some cases, water may have an unpleasant taste or odor or could even cause an upset stomach. Additional tests may need to be done based on the results of the specific conductance test.

How can specific conductance become elevated in my well water?

Specific conductance can be high due to a number of different factors:

- Rock and soil type – Certain minerals in rock and soil will be more prone to dissolve into water
- Acid mine drainage – Drainage from operating and abandoned mining sites will increase dissolved solids such as copper and iron
- Agricultural runoff – Runoff from farms can contain fertilizers, which contain nitrates and phosphates.
- Road runoff – Runoff from roads can contain salts and other chemicals that can increase specific conductance